

Plasmonic coupling in Au metal nanospheres: a computational study

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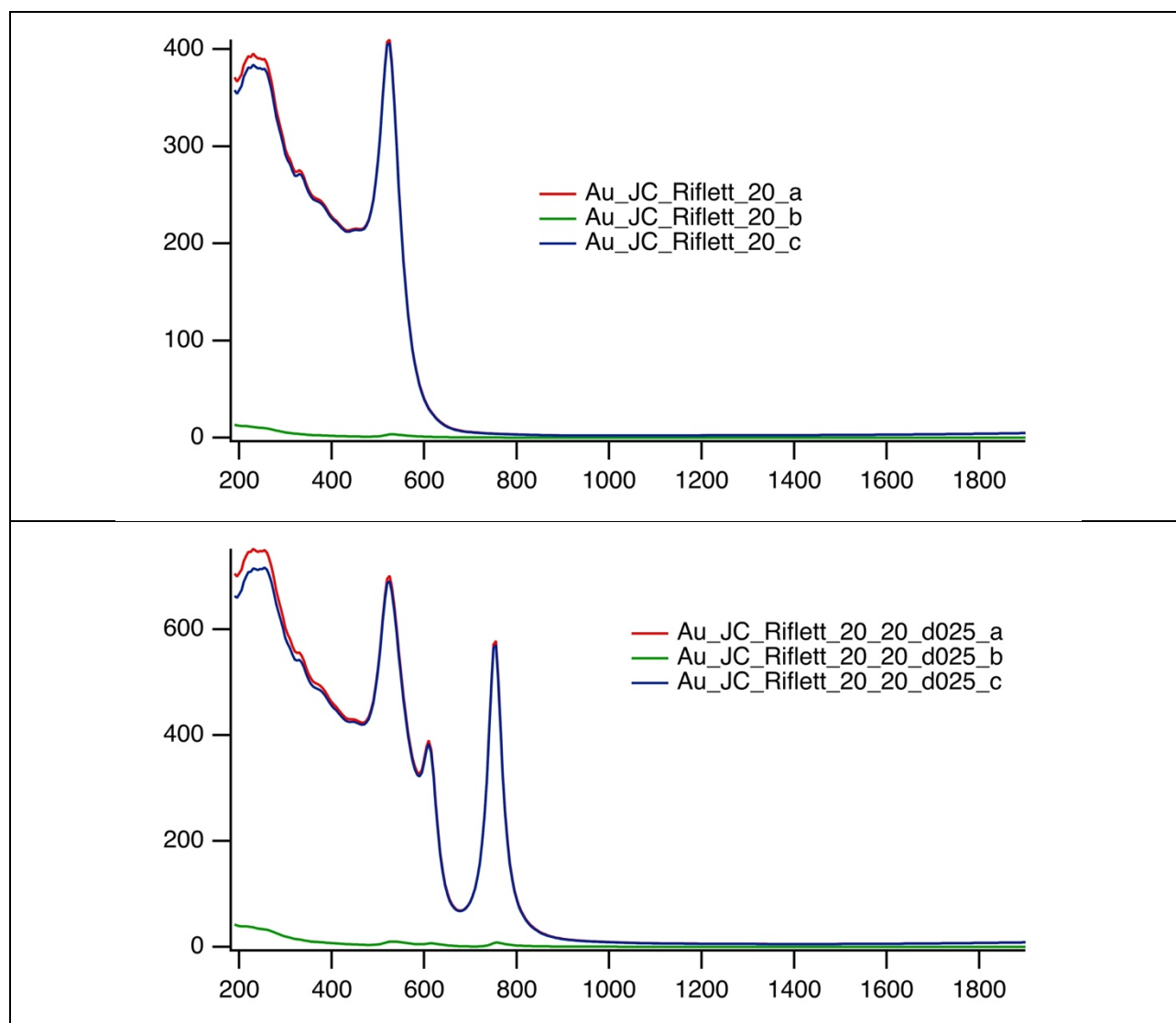
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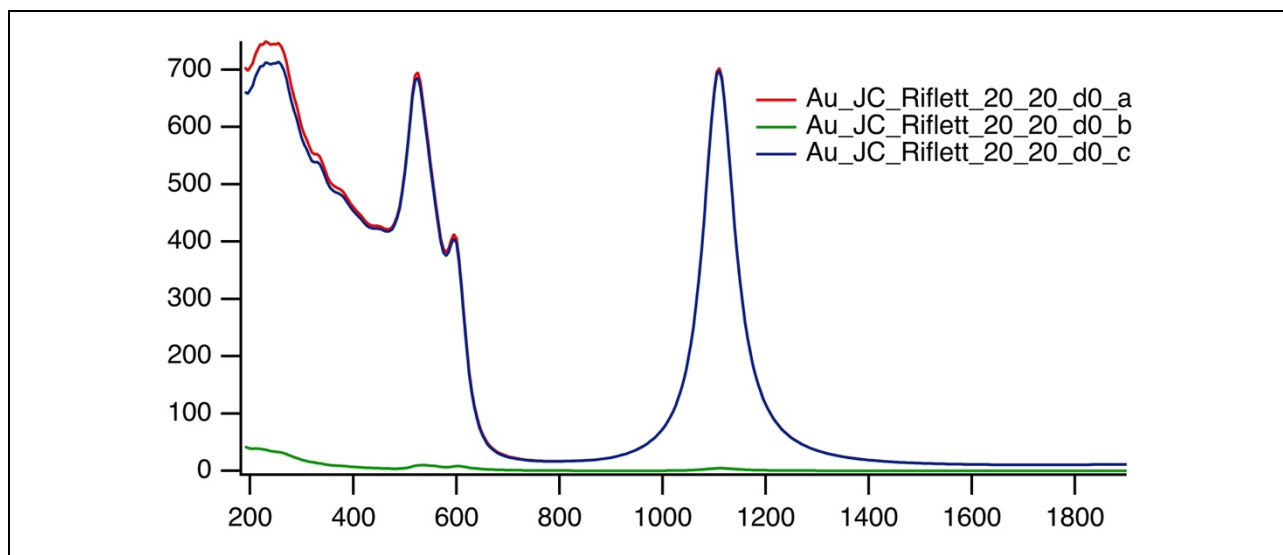
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Letter

In 2010 El-Sayed and coworkers studied experimentally the plasmonic coupling, the localized surface plasmon resonance LSPR function of distance of the experimentally prepared by lithography nanostructures.

In this brief letter we wish to present the results of the electrodynamics calculations (Mie theory) obtained on a couple of identical gold nanospheres in contact and at 0.25nm of distance, on an energy range much wider than the one abovementioned experimentally studied (200-850nm). Interestingly, as already experimentally demonstrated LSPR energy is function of mutual distance, and this is confirmed by our calculations, that therefore spanned on a much more energy range showing LSPR towards the infrared (1200 nm) with enhancements factors up 10^9 .





diameters/nm	Lambda _{in} /nm	266	488	514	633	785
and distance	E/E _{in} ⁴ _water					
20		056	06	3.8	47	15.5
20_20_d0		250	350	5*10 ³	5*10 ⁷	1,2*10 ⁷
20_20_d0.25		350	500	5.5*10 ³	1*10 ⁸	1*10 ⁹

diameter/nm	Lambda _{in} /nm	633	1100	1110	1115	1150	1200
distance/nm	E/E _{in} ⁴ _water						
20_20		5*10 ⁷	108	4*10 ⁷	4*10 ⁷	9*10 ⁹	3*10 ⁹